

Amendments to the Specification:

Please replace paragraph [0037] with the following amended paragraph:

[0037] Figures 1 and 2 provide a high level overview of the preferred arrangements for the consecutively wound cells of the preferred embodiments. Figure 3 shows an exemplary cross-sectional view of one battery cell, taken substantially along lines 3-3 of Figure 2. Although taken along line 3-3 of Figure 2, cutting the outermost battery cell 14, the description that follows is equally applicable to any of the battery cells present. Figure 3 shows that each turn of the exemplary battery cell is made up of a plurality of layers of material. Though Figure 3 shows only the cross-section of one turn to simplify the drawings, any number of turns may be used for a particular cell, depending upon the desired amperage capacity and the diameter of the winding. The battery cell comprises at least an anode layer 18, an electrolyte layer 20, and a cathode layer 22 which are preferably as thin as possible. Using technology in existence at the time of writing this specification, these layers may be as small as 0.2 microns each; however, as film technology advances, the thickness of sheets of material may become thinner, and preferably the thinnest layers available are preferred. In the most preferred embodiments, the anode layer 18 is a lithium coated plastic sheet, the electrolyte layer 20 is preferably a solid polymer electrolyte, and the cathode layer 22 is preferably a lithium coated plastic sheet, as described more fully in the application Serial Nos. 09/388,741 (now U.S. Patent No. 6,645,675) and 09/388,733 (now U.S. Patent No. 6,664,006) incorporated by reference-hereinabove. The layers of material that make up the battery cell of the preferred embodiments using film technology in existence as of the writing of this specification may be less than 30 microns thick, meaning that tens, hundreds or thousands of turns may be used depending on the diameter of the winding and the desired amperage capacity of the particular battery cell.

Please replace paragraph [0038] with the following amended paragraph:

[0038] Consider for purposes of explanation a consecutively wound battery system having two battery cells, a cross-section of a portion of the windings of the two cells exemplified in Figure 4A. Thus, portion 24 represents the cross-section of a first battery cell (that may comprise hundreds or thousands of turns), and portion 26 represents the cross-section of a second battery cell (that may also comprise hundreds or thousands of turns) separated by an insulating

layer 64[1]). Each of the portions 24, 26 comprises at least an anode layer 18, an electrolyte layer 20 and a cathode layer 22. Because in an embodiment the anode and cathode layers extend beyond the electrolyte layer, there are two possible configurations for the multiple cell battery having two battery cells – the anode layers extending in the same axial direction (with the cathode layers extending in a second axial direction), or the anode layer from a first cell extending the same direction as the cathode layer of the second cell. These configurations allow for several different advantageous battery solutions from the integral unit multiple cell battery.

Please replace paragraph [0042] with the following amended paragraph:

[0042] Each battery cell of the consecutively wound battery system comprises a plurality of turns of the layered anode/electrolyte/cathode material. Referring again to Figure 3, preferably the anode layer or layers 18 are offset in a first axial direction (the axis 16 direction is shown in Figure 3, but is not intended to be to scale or in proper relationship to the center of the winding of the exemplary battery cell) and the cathode layer or layers are offset in a second axial direction. Thus, traditional electrical current flow (which is opposite of electron flow) preferably leaves the battery cell from the anode layer 18, and enters the battery cell through the cathode layer 22. However, given that each battery cell may comprise tens, hundreds, or even thousands of turns, and further that ~~the thickness of~~ each of the anode and cathode layers may only be less than few microns thick, preferably, electrical contact is not made at only a single location of the otherwise continuous anode material extending beyond the electrolyte. Likewise, current flowing back to the battery preferably does not enter at a single point along the otherwise continuous cathode layer extending beyond the electrolyte. Rather, the portions of the anode layer extending beyond the electrolyte are preferably electrically connected by the use of some form of conductive coating. Likewise, the portions of the cathode layer extending beyond the electrolyte are also preferably electrically coupled using a conductive coating.

Please replace paragraph [0043] with the following amended paragraph:

[0043] For purposes of explaining how the conductive coating couples the various turns of each battery cell, and likewise may couple different battery cells within the same consecutively wound battery system, reference is now made to Figure 7A. Figure 7A shows a cross-sectional view of a

consecutively wound battery system having two battery cells 60 and 62, each battery cell 60, 62 having an exemplary two turns. Preferably, a layer of insulating material 64 is disposed between each battery cell (preferably a sheet of polyester), and that layer of insulating material 64 preferably extends at least 0.5 millimeter beyond the offset of the anode and cathode material. Though Figure 7A is merely a cross-section of a winding, it will be understood that the insulating material 64 preferably makes at least one complete wrap around the consecutively wound battery system. Referring to the upper or outermost battery cell 60 of Figure 7A, inasmuch as the anode material extending beyond the electrolyte is a continuous sheet, it would be possible to merely tap or electrically contact the windings at one location, for example location 66, and extract current from the battery cell 60. However, tapping the otherwise continuous anode at one location may be difficult to do given the relatively small thickness of the anodes (and cathodes), and further tapping at only a single location may result in significant heating and resistance losses. Rather, axial or rolled ends of the consecutively wound battery system are preferably coated with a sprayed-on metal coating, a process known as shooing, as described in the copending application Serial No. 09/388,733 (now U.S. Patent No. 6,664,006) incorporated by reference hereinabove. The end-coating could equivalently be accomplished with conductive adhesives, conductive epoxies, solder paste or other functional means. It is also possible that the various anode and cathode turns could be connected by physical means, for example by tab welding a plurality of tabs connected at the anode and/or cathode in various locations, but this is not preferred.

Please replace paragraph [0047] with the following amended paragraph:

[0047] The embodiments shown in Figures 7A-C are constructed by offsetting the anode and cathode material. A second embodiment for coupling the turns of a battery cell, and also coupling battery cells to each other in the stacked configuration, is shown in Figure 10. In this second embodiment, the anode and cathode material is offset only slightly, or preferably not at all. In this way, the shooing 68 electrically contacts the anode and cathode layers on both sides. In order that the battery cells ~~not be~~ are not shorted by the shooing, however, a series of dielectric lanes 90 are preferably manufactured into the anode and cathode sheets such that the portion of the anode or cathode in contact with the shopping 68 is electrically isolated from the

portion of the anode or cathode in contact with the electrolyte. This electrical isolation is possible because of the construction of the anode and cathode sheets.

Please replace paragraph [0048] with the following amended paragraph:

[0048] The anode and cathode sheets used to create battery cells of the preferred embodiment are formed on sheets or meshes of insulating material such as polyester. The sheets or meshes are then coated with thin layers of metal, the precise type of metal depending on the chemistry of the battery cell. The lithium battery cells of the preferred embodiment are described in detail in copending application serial numbers 09/388,741 (now U.S. Patent No. 6,645,675) and 09/388,733 (now U.S. Patent No. 6,664,006). Referring again to Figure 10, anode sheets comprise an insulating material 92 coated with at least one metal layer 94. The dielectric lane 90 thus comprises a portion of metal layer 94 removed, or preferably not deposited during the coating process. Thus, while anode metal 94 may electrically contact the shooing 68 on both sides, it is electrically isolated on one side from the portion of the metal in contact with the electrolyte (labeled "E" in Figure 10). Having the shooing contact both the anode and cathode on each side provides better mechanical strength of the stacked battery system, better handles swelling caused by temperature fluctuations, and provides better heat dissipation. Also, the arrangement where little or no offset of the layers is required provides many additional manufacturing benefits in the stacked configuration, discussed more fully below.